



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: SaM146-1S17 BYPASS RATIO (-): 4.4
 UNIQUE ID NUMBER: 01P11PJ003 PRESSURE RATIO π_{co} (-): 21.8
 COMBUSTOR:
 ENGINE TYPE: MTF RATED OUTPUT F_{co} (kN): 69.2

REGULATORY DATA

| CHARACTERISTIC VALUES: | LTO_{mass}/F_{co} (mg/kN) | LTO_{num}/F_{co} (particles/kN) | NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$) |
|------------------------------------|--------------------------------|--------------------------------------|---|
| LTO/F_{co} AND MAX $nvPM_{mass}$ | 306.0 | 2.93E+15 | 1044 |
| AS % OF CAEP/10 LIMIT | - | - | 12.9 |
| AS % OF CAEP/11 LIMIT (InP) | 9.7 | 15.5 | |
| AS % OF CAEP/11 LIMIT (NT) | 39.6 | 31.5 | |

MEASURED DATA

| MODE | POWER SETTING (% F_{co}) | TIME minutes | FUEL FLOW kg/s | EMISSIONS INDICES* | | NVPM MASS CONCENTRATION PEAK $nvPM_{mass}$ ($\mu\text{g}/\text{m}^3$) |
|---|--------------------------------|-----------------|-------------------|------------------------|------------------------------|---|
| | | | | EI_{mass} (mg/kg) | EI_{num} (particles/kg) | |
| TAKE-OFF | 100 | 0.7 | 0.791 | 163.0 | 1.13E+15 | |
| CLIMB OUT | 85 | 2.2 | 0.653 | 109.0 | 1.08E+15 | |
| APPROACH | 30 | 4.0 | 0.228 | 2.6 | 1.22E+14 | |
| IDLE | 7 | 26.0 | 0.097 | 1.7 | 5.71E+13 | |
| LTO TOTAL (kg, mg, number of particles) | | | 326 | 15212 | 1.46E+17 | - |
| NUMBER OF ENGINES | | | | 1 | 1 | 1 |
| NUMBER OF TESTS | | | | 3 | 3 | 3 |
| AVERAGE LTO/F_{co} VALUES (mg/kN, particles/kN) | | | | 220.0 | 2.11E+15 | - |
| MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$) | | | | 163.0 | 1.15E+15 | 811 |

* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

| MODE | POWER SETTING (% F_{co}) | CORRECTED EMISSIONS INDICES | |
|-----------|--------------------------------|-----------------------------|----------------------------------|
| | | EI_{mass_sl} (mg/kg) | EI_{num_sl} (particles/kg) |
| TAKE-OFF | 100 | 191.0 | 2.92E+15 |
| CLIMB OUT | 85 | 132.0 | 3.15E+15 |
| APPROACH | 30 | 4.1 | 7.28E+14 |
| IDLE | 7 | 2.5 | 2.85E+14 |

AMBIENT CONDITIONS

| | From | To | FUEL | |
|--------------------------------|--------|--------|-------------------------------|-------|
| BAROMETER (kPa) | 99.3 | 100.4 | HEAT OF COMBUSTION (MJ/kg) | 43.10 |
| TEMPERATURE (K) | 286.4 | 299.2 | HYDROGEN CONTENT (%mass) | 13.77 |
| HUMIDITY (kg water/kg dry air) | 0.0062 | 0.0125 | AROMATICS CONTENT (%vol) | 17.9 |
| | | | NAPHTHALENE CONTENT(%vol) | 1.37 |
| | | | SULPHUR CONTENT (ppm by mass) | 694 |

MANUFACTURER: PowerJet S.A.
 TEST ORGANIZATION: PowerJet S.A.
 TEST LOCATION: Villaroche, France
 TEST DATES: 04/06/2019-07/06/2019

REMARKS

1. Test engine 146009-1B
2. Certification report CR-037 S2 / CR-137 / CR-237 Rev1